

MARS GLOBAL ATMOSPHERIC THERMAL BEHAVIOR FROM THE MGS HORIZON SCIENCE EXPERIMENT

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The Horizon Science Experiment (HORSE) on the MGS orbiter uses the Mars Horizon Sensor Assembly to measure 15 micrometer band thermal emission from the middle Martian atmosphere near 1 mbar. MHSA data were used to assess general atmospheric behavior during both phases of MGS aerobraking. Since mapping began in March 1999, data acquisition has been continuous, with 12 orbits/day providing rapid longitudinal coverage. The instrument's four quadrants aligned orthogonally on the Martian limb provide valuable coverage in local time; two quadrants fore and aft give sampling along the ground track (3 AM/PM at the equator), while the other two sample ± 1.4 hrs in local time. Coverage of six local times per day for most of the planet makes the MHSA sensitive to diurnal temperature variations, including the semidiurnal tidal mode, which is particularly affected by atmospheric dust. Because the orbit is slightly elliptical, the fore and aft quadrants sample slightly different levels for a given lat/lon point, giving information about lapse rate. The Mars atmosphere warmed steadily between Ls 122 and 230 during 1999, and then cooled, indicating a mild dust event occurred. Both the latitudinal and diurnal behavior were very similar to the 1977a dust storm as observed by the Viking IR Thermal Mapper (T. Martin, *Icarus* 45, 1981). A warm zone developed in northern and southern midlatitudes, and the temperature maxima shifted in local time to 1800 in the south and 1100 in the north.